AMENDMENTS TO THE DRAWINGS:

The attached sheets of drawings include changes to Figs. 1 to 6. These sheets, which include Figs. 1 to 6, replace the original sheets including Figs. 1 to 6.

Attachment: Replacement sheets

REMARKS

I. Introduction

Upon entry of the present amendment, claims 16-29 will be pending in the present application. By the present amendment, drawing sheets have been replaced, and claims 16 and 25 have been amended. No new matter has been added herein by the present amendment, as support thereof may be found in the current specification (the substitute specification) at, *inter alia*, page 5, lines 7-10.

In view of the foregoing amendments and the following remarks, Applicant respectfully submits that the claims are now in condition for allowance. Applicant points out that the amendments made herein are made without prejudice to the future prosecution of such cancelled, amended or modified subject matter in a related divisional, continuation or continuation-in-part application.

II. Objection to the Drawings

The Office Action objects to the drawings because of the quality of the black and white photographs in Figures 1-3 and 5, and because Figures 4 and 6 contain words in the French language. Applicant has herein submitted replacement sheets for Figures 1-6, which are of better quality and are entirely in the English language. Applicant thus respectfully submits that the objections to the drawings have been overcome and should therefore be withdrawn.

III. Rejection of Claims Under 35 U.S.C. §103(a)

Claims 16-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over alleged admissions by applicant, and further in view of U.S. Patent 5,876,524 ("Andersson"). According to the Examiner, "[i]t would have been obvious to one of

ordinary skill at the time of invention to modify the method of forming a flat zirconium alloy product disclosed as old in the cited admissions by Applicant by introducing the advantageous sequencing of β quenching-cold rolling-annealing with accompanying temperature and time parameters as disclosed by Andersson" (Office Action mailed April 19, 2007, page 6). Applicant respectfully submits that these rejections should be withdrawn for at least the following reasons.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish *prima facie* obviousness, the prior art reference(s) must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). However, "a patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. ___, No. 04-1350, slip op. at 14 (April 30, 2007). Rather,

> [o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and to the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.

Id. Further, "the claimed combination cannot change the principle of operation of the primary reference or render the reference inoperable for its intended purpose." MPEP § 2145.

In contrast to any alleged admissions made by the Applicant and Andersson, the method and product of the present invention, as currently recited in independent

claims 16 and 25, include "subjecting the flat arrangement, after the β quenching, to a rolling operation performed in a single rolling sequence without intermediate annealing, the rolling performed at a temperature lying in a range ambient to 200°C, with a reduction ratio lying in a range 2% to 20%." Dependent claims 17-24 and 26-29 depend form these independent claims, and thus include this claim limitation as well. Although the Examiner alleges that "the teachings of Andersson show that Applicant is not the first to conceive of this ordering of the metalworking steps," Applicant respectfully disagrees.

The Examiner has quoted several portions of Andersson as allegedly showing "the practice of performing cold rolling operations immediately after β quenching" (Office Action mailed April 19, 2007, page 5), and they will be addressed as follows.

First, the Examiner cites to Andersson's statement that "U.S. Pat. Nos. 4,450,016 and 4,450,020 describe heat treatment in the β-phase range by beta-quenching the tube billet before the last two cold rolling steps followed by two subsequent cold rolling steps to a final cladding tube *with an intermediate vacuum anneal* in the α-phase range." Andersson, col. 2, lines 21-25 (emphasis added). Thus, this passage of Andersson explicitly describes an intermediate annealing step. However, in stark contrast to this passage in Andersson, the present claims include the recitation of "subjecting the flat arrangement, after the β quenching, to a rolling operation performed *in a single rolling sequence without intermediate annealing*." (emphasis added). Thus, this passage from Andersson does not disclose or suggest the presently claimed rolling operation step.

Second, the Examiner cites to Andersson's statement that "U.S. Pat. No. 3,865,635 discloses a method where the beta-quenching is performed before the last cold rolling step in the manufacture of final cladding tubes to achieve improved creep

strength throughout the thickness of such tube." Andersson, col. 2, lines 42-46. However, as disclosed in U.S. Patent 3,865,635, "[t]he degree of reduction in the last cold working step influences the creep strength in the same way as without β-quenching. This means that the effect according to the invention is additive to the conventional effect of cold work, these being an incentive for high degree of cold work from production economy point of view. It has thus been found advantageous to reduce the cross-sectional area of the material *at least 50 percent in the last cold working step*." U.S. Patent 3,865,635, col. 3, lines 38-46 (emphasis added). In addition, the example given in column 4 of U.S. Patent 3,865,635 includes a reduction rate of 80%. However, in contrast to this passage in Andersson and the teachings of U.S. Patent 3,865,635, the present claims include the recitation of "subjecting the flat arrangement, after the β quenching, to a rolling operation performed in a single rolling sequence without intermediate annealing, the rolling performed at a temperature lying in a range ambient to 200°C, *with a reduction ratio lying in a range 2% to 20%*" (emphasis added). Thus, this passage from Andersson and U.S. Patent 3,865,635 do not disclose or suggest the presently claimed rolling operation step. Furthermore, U.S. Patent 3,865,635 is directed to a method of making a tube and increasing the creep strength of the tube, both of which are in contrast to the "flat arrangement" as is recited in the pending claims.

Third, the Examiner cites to Andersson's disclosed method wherein "[t]he cold deformation after β-quenching at final dimension of structural tube parts for fuel skeletons, which are characterized by subjecting a minor portion of the finally rolled and quenched tubes to a more reduced outer diameter, can be performed by cold rolling or cold drawing with a reduction degree of 5-30%, preferably by cold drawing with a reduction degree of 7-17%. The final vacuum annealing in the α-phase range

on the product after β-quenching in final dimension is performed at a temperature and a time that brings about a product with an annealing parameter value, A, in the range 3.4×10^{-16} to 3.4×10^{-13}, and preferably in the range 6.0×10^{-15} to 1.7×10^{-13}." Andersson, col. 3, line 58 to col. 4, line 3.

In regard to this third point of the Examiner, Applicant notes that Andersson discloses a method of manufacturing tubes, and thus does not teach or suggest the "flat arrangement" of the presently claimed method or product. Furthermore, although the Examiner concludes that "[a]lthough the Andersson [sic] explicitly teaches the method as applied to cladding and construction tubes formed from billets, the operations and parameters involved are fully applicable to flat products, as is well known in the art" (Office Action mailed April 19, 2007, page 6), Applicant respectfully disagrees.

This obviousness rejection based on Andersson is deficient for at least the reason that the references do not provide a reason for one of ordinary skill in the art to make the proposed combination or modification. As recently articulated by the U.S. Supreme Court, "a patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. ___, No. 04-1350, slip op. at 14 (April 30, 2007). Moreover, merely because certain references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). If the desirability of the combination cannot be found in the prior art, then a rationale must be provided that is reasoned from knowledge generally available to one of ordinary skill in the art, based on established scientific principles, or based on legal precedent established by prior case law. *See*

M.P.E.P. § 2144. At least a convincing line of reasoning must be presented to support the rejection. *Ex Parte Clapp*, 227 U.S.P.Q. 972 (Bd. Pat. App. & Inter. 1985). It is respectfully submitted that the assertion in the Office Action that "the operations and parameters involved [in Andersson] are fully applicable to flat products, as is well known in the art," is not a convincing line of reasoning for making the proposed modifications which is necessary to support an obviousness rejection. Rather, this assertion is a conclusory statement unsupported by the cited documents. Accordingly, the present rejections are apparently relying on the Applicant's disclosure and are therefore based on nothing more than improper hindsight, which cannot support an obviousness rejection. Additionally, as this assertion relies on what "is well known in the art," Applicant respectfully traverses this assertion and respectfully requests published information concerning this assertion and/or an affidavit under 37 C.F.R. § 1.104(d)(2) concerning this assertion.

Furthermore, Applicant respectfully points out that a major difference between flat and long products used for tubes, is that a long product used for tubes (like the ones described in Andersson) is a finished product. It is intended to be welded to grids for forming a skeleton (guide tubes) or to plugs for forming a fuel rod (cladding tubes). In contrast, a flat product (like the ones of the present invention) is intended to be further shaped by folding (*e.g.*, the box in which the fuel rods are installed) or by drawing (*e.g.*, the grids). Precise requirements on mechanical and surface properties must be fulfilled for flat products (*see, e.g.,* substitute specification, page 8, lines 1-4), which have no counterparts in the making of long products used for tubes. Thus, to one of ordinary skill in the art, a method which is taught to be valid for producing long products used for tubes (such as in Andersson) would not seem

to be transferable to producing flat products because the desired properties of the very final product would be quite different in each case.

In addition, Applicant notes that Andersson discloses that "[t]he cold deformation after β-quenching at final dimension of structural tube parts for fuel skeletons, which are characterized by subjecting *a minor portion of the finally rolled and quenched tubes to a more reduced outer diameter*, can be performed by cold rolling or cold drawing with a reduction degree of 5-30%, preferably by cold drawing with a reduction degree of 7-17%." Andersson, col. 3, line 58-64 (emphasis added). Furthermore, it is not all tubes or even entire tubes that are subjected to this cold rolling or cold drawing process, but only a minor portion of structural guide tube parts, in order to give this portion a more reduced outer diameter. *See* Andersson, col. 3, line 58-64; and col. 4, line 63 to col. 5, line 4. As would be understood by one of ordinary skill in the art, the aim of such an operation is to locally give the guide tube a shape which helps to slow down the progression of the control clusters. If this treatment with low reduction rates was considered as optimal generally speaking, then Andersson would teach or suggest to perform it on the whole guide tube, and/or on other kinds of tubes, particularly cladding tubes. However, as disclosed in Andersson in col. 4, line 59 to col. 5, line 11, it is only the structural guide tubes, on a portion thereof, which are submitted to such a low reduction cold rolling or cold drawing process, while the remaining parts of the structural guide tubes, and also the cladding tubes and the other structural tubes in their entireties, were not submitted to this process. Thus, as disclosed in Andersson, there are distinct and different manufacturing processes which are suitable for different tube products depending upon the use of the tube. Similarly, manufacturing processes for tube products are not necessarily applicable for flat products, and the Examiner's assertion that "the

operations and parameters involved [in Andersson] are fully applicable to flat products, as is well known in the art," is not supported by the cited documents.

Moreover, in contrast to Andersson, the method and product of the present invention, as currently recited in independent claims 16 and 25, includes "obtain[ing] within the flat arrangement an acicular structure at an end of the β quenching." Such an acicular structure is not disclosed in Andersson. Furthermore, Andersson discloses that "β-quenching of the final product is carried out by heating the product to a temperature in the β-base range, suitably a temperature of 950°-1250° C. and preferably a temperature of 1000°-1150° C. during a time sufficient to achieve complete transformation to β-phase followed by quenching to a temperature in the α-phase range. The cooling from the β-phase range to the temperature 700° C. suitably occurs with a cooling rate of 100° - 400° C./sec and the cooling from 700° C. to 300° C. or less occurs with a cooling rate of more than 10° C./sec." Andersson, col. 3, lines 48-57. Thus, Andersson does not disclose an acicular structure, but does disclose a fast, regimented quenching speed, followed by an annealing step only in the α-phase range. In contrast to the teaching of Andersson, the presently claimed method and product include an acicular structure, no such fast, regimented quenching speed, and a final annealing treatment in the α range or in the α + β range. Thus, these distinctions further support the idea that manufacturing processes for tube products are not necessarily applicable for flat products, and the Examiner's assertion that "the operations and parameters involved [in Andersson] are fully applicable to flat products, as is well known in the art," is not supported by the cited documents.

Also, Andersson discloses that "[t]he zirconium-based alloy is preferably a zirconium-tin-alloy, the so-called Zircaloy-2 and Zircaloy-4 type alloys having the

contents of 1.2-1.7% tin, 0.07-0.24% iron, 0.05-0.15% chromium and 0-0.08% nickel, small additions of oxygen, silicon or carbon, the remainder being zirconium and possible impurities wherein the percentage values refer to weight percent." Andersson, col. 4, lines 24-30. Applicant notes that in contrast to the disclosure of Andersson, pending claims 19 and 21 include alloy elements containing niobium (Nb). Thus, as Andersson does not disclose niobium containing alloys, one of ordinary skill in the art would not be motivated to apply the teachings therein to niobium containing alloys, such as those recited in pending claims 19 and 21.

Thus, for at least the preceding reasons, it is respectfully submitted that the rejections under 35 U.S.C. §103 should be withdrawn.

IV. Conclusion

It is respectfully submitted that all pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,
KENYON & KENYON LLP

Dated: October 18, 2007 By: _____

Kevin T. Godlewski
Reg. No. 47,598
One Broadway
New York, New York 10004
(212) 425-7200

Customer No. 26646

Appendix